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5G Evolution and Beyond "6G?"

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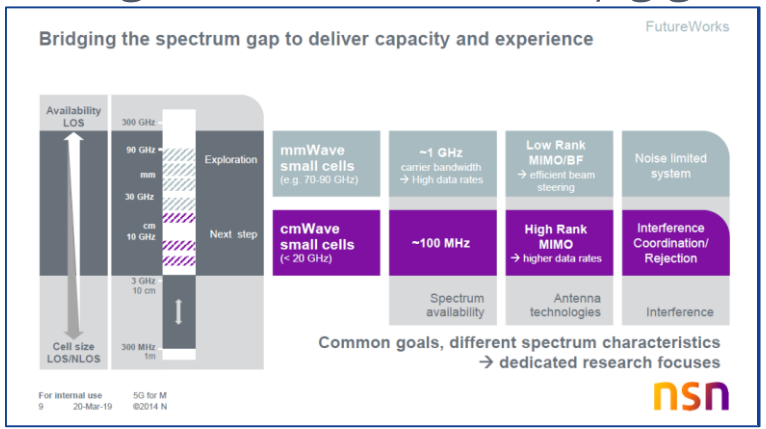
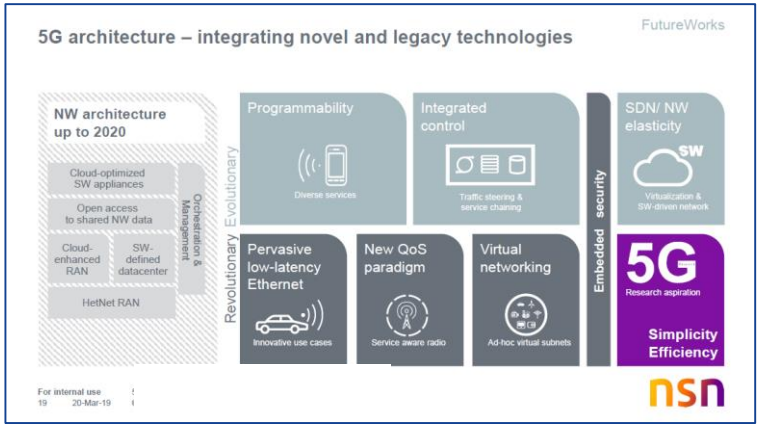
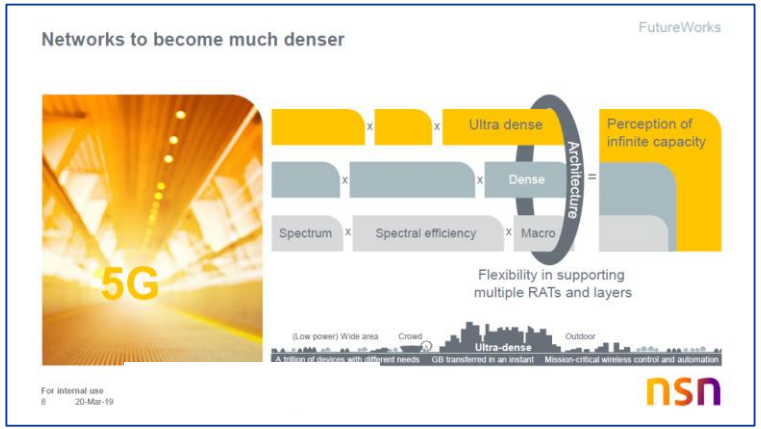
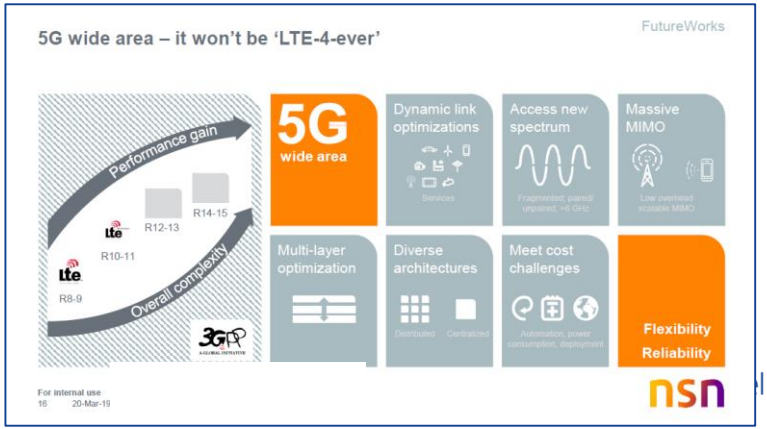
Looking ahead to 5G

Building a virtual zero latency gigabit experience

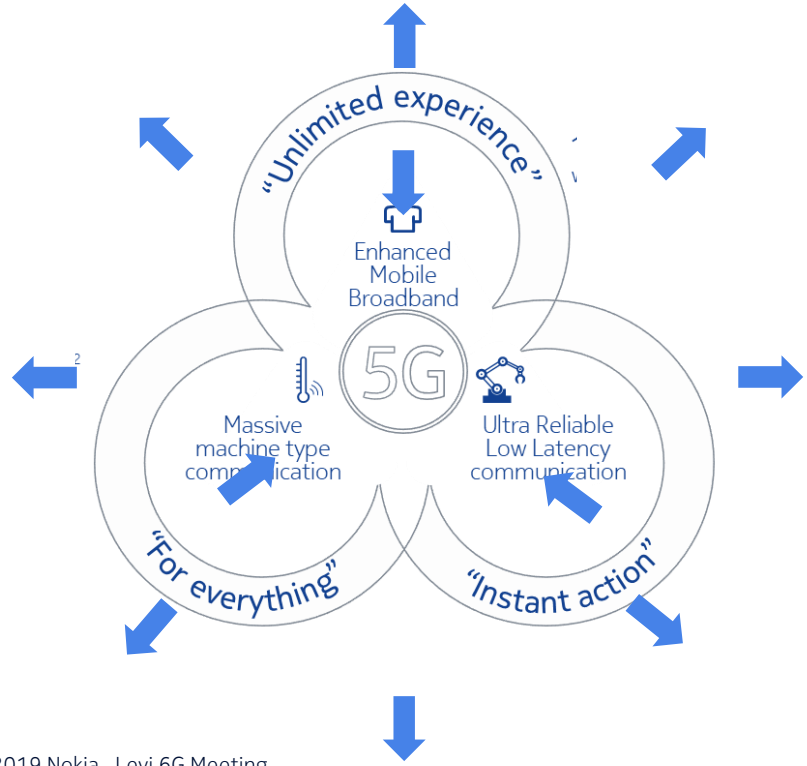








5G targets were stretching
...but "we always want more"



- Initial 5G was designed *flexible* and *scalable* with the 3 use case families in mind.
- 5G will continue to expand on new use case and new KPI's
- But...will there be a limit to the "one size fit all" *flexibility* and *scalability* of 5G?

Looking ahead to 6G

What we did not focus on in initial 5G design

1. UL heavy traffic
2. Industrial Ethernet use cases including broadcasting, deterministic traffic (TSC/TSN)
3. Higher mm-wave and Tera-Hz bands (new FR)
4. Extreme long range communication - NTN / HAPS
5. Extreme short range communication – Lean cable replacement(e.g. PAN/RAN*/DCB)
6. Connectivity to swarms of..
7. Networks of networks (sub-networks)
8. Radio network as an intelligent sensor (location, time, movement, 3D-Scanning…….
9. AI/ML enablers
10. Neutral Host (new network paradigm)
11. Broadcast
12. ???

* RAN= Robot Area Networks

…. most aspects are solved in ongoing or coming 5G releases
….and we don't know yet what are the shortcomings of 5G

6G will include 5G evolved capabilities and more…
In the end it is about service and value creation

Open and flexible

- Over the first 30 years of mobile communication we only invented 3 services: **Voice, SMS & Mobile broadband**

- During the last 5 years we have been creating: **LPWA IoT,V2X, UAV, URLLC, TSC, NTN.**

- Continuing the **acceleration of new services** likely demands a new paradigm of standardization versus profiles

Sustainable

- Both the opportunities and and fear of 5G is already a major topic in the public and industry.

- We need to increase focus on sustainability:

- Energy consumption
- Batteri life-time
- Electromagnetic Fields
- Recyling of equipment
- Cost
- Environmental integration
- Social inclusive

Intelligent and smart

- Future networks will offer both Edge AI and network sensing:

A combination of these will drive new value paradigms.

Trusted

- New operator and customer paradigms sets new demands to security and privacy:

- Potentially introduce an external user-trusted privacy and security broker.

Future X - Architecture Vision for 5G evolution and beyond

RAN

THz frequencies
Extreme URLLC and TSC
Network as a sensor

Cloud Native Architecture

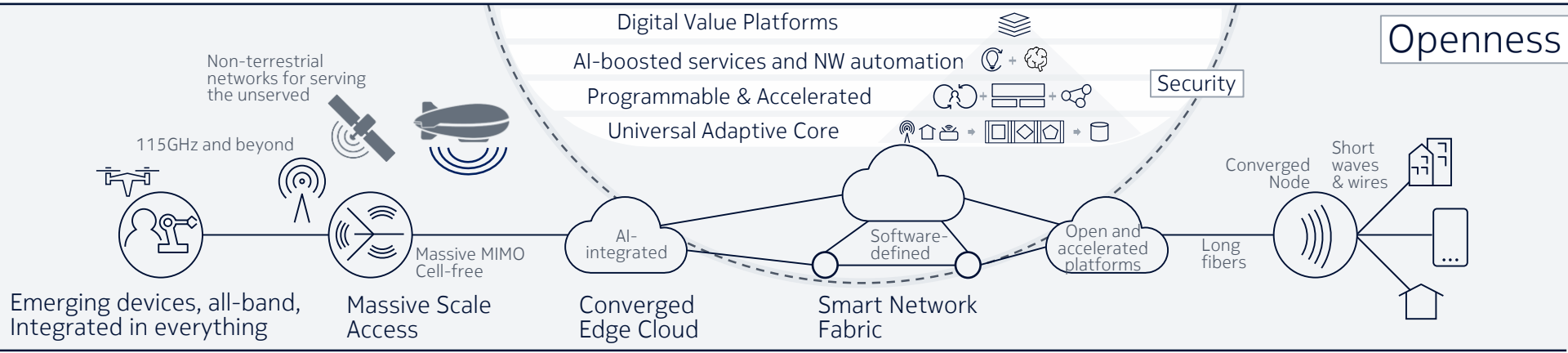
Web Scale Capacity and Programmable
Multi Vendor Mashup Services
Open platforms and interfaces

Zero-Touch optimization and automation

Multitenant and demand-time driven network slicing b2b

Embedding ML/AI into Architecture

Pervasive across the architecture



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Conclusions on 6G

- Our best estimate for 6G launch, if there will be a 6G, is ~2030, but we don't know yet what it will be!
  Our current view on 6G technologies:
  - More than 5G Evolution in all aspects -> *"we want more"*
  - Open and flexible -> *"fast and efficient new service creation*"
  - Sustainable -> *"Energy, Battery, Cost, EMF, recycling, value creation"*
  - Intelligent -> *"Embedded artificial intelligence with a 6th sense"*
  - Trust – > *"Secure and full privacy E2E in new network and user paradigm"*

5G evolution will potentially solve most the above aspects?
Complexity of specs may anyway call for a "clean slate" by 2030 -> "6G?"

Questions?